

cancelled without prejudice, claims 92, 98 and 107 have been amended, and new claims 135-141 have been added. Thus, claims 92-94, 98, 100-112, and 135-141 are now pending in the current application. It is believed that no new matter has been added by the current amendment. Applicants respectfully submit that the pending claims are now in condition for allowance.

Applicants thank the examiner for the courtesy extended during an interview on Monday, March 10, 2003.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned “**Version with markings to show changes made.**”

II. ELECTION OF SPECIES REQUIREMENT

The Examiner has required the Applicants, under 35 U.S.C. § 121, to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. In addition, the Examiner has required the Applicants to select an ultimate species (*i.e.*, a specific organometallic compound) that will be used as the starting point for search and examination purposes.

To confirm the provisional election which was made via a telephone conversation with Examiner Yamnitzky on May 8, 2002, Applicants hereby elect, without traverse, to prosecute the invention of species (a) (an emissive layer comprising a phosphorescent organometallic compound and an organic light emitting device comprising an emissive layer comprising a phosphorescent organometallic compound wherein the organometallic compound is an iridium compound). The pending claims which read on the elected species are claims 92-

94, 98, 100-103, 107, 109-112, 135, 137 and 139-141. In addition, Applicants hereby elect Ir(ppy)_3 as the ultimate species to be used as the starting point for search and examination purposes.

Applicants respectfully request that, upon the allowance of a generic claim, claims directed to non-elected species including all the limitations of the generic claim be considered, in accordance with 37 C.F.R. § 1.141, and ultimately allowed.

III. INVENTORSHIP

The inventorship for the entire application is correct as presently stated after entry of the accompanying amendment filed pursuant to 37 C.F.R. § 1.48(b); however, each inventor did not make a contribution to the subject matter of every pending claim. It is believed that the subject matter of all of the pending claims was commonly owned only by the University of Southern California and Princeton University at the time the inventions were made, except for claims 92-94, 98 and 101-103. It is believed that Peter Djurovich made a contribution to the subject matter of claims 92-94, 98 and 101-103 at a time when he had no obligation to assign to the University of Southern California or Princeton University, on or after March 23, 1999 but before May 13, 1999.

IV. OBJECTIONS TO DISCLOSURE

The disclosure has been objected to because of various informalities. For at least the following reasons, we respectfully submit that these objections should be withdrawn.

The Examiner has objected to the U.S. application serial number disclosed at page 8, line 5 of the specification as not corresponding to the subject matter attributed thereto.

Applicants have herein amended this part of the specification to include a reference to U.S. application serial no. 09/153,144, which correctly corresponds to the exciton-blocking-layer subject matter attributed thereto.

The Examiner has also objected to the description of Figure 7 on pages 16-17 of the specification, due to the reference to an “inset” of Figure 7. Applicants have herein amended the description of Figure 7 on pages 16-17 of the specification to replace the “inset” reference with a reference to the “bottom portion of Figure 7.”

The Examiner has also objected to the formula shown for Pt(bph)(bpy) on pages 24 and 31 of the specification as not corresponding to the chemical name. Applicants have herein amended page 24 (and deleted the duplicative material on page 31) of the specification to correct the structural formula shown for Pt(bph)(bpy). The Applicants have also corrected the misspelling of “bipyridianto” to now read --bipyridinato--.

The Examiner has also objected to page 30, line 14 through page 31, line 12 of the specification as being a duplicate of page 23, line 4 through page 24, line 5. Applicants have herein deleted page 30, line 14 through page 31, line 12 of the specification.

Thus, for at least the preceding reasons, Applicants respectfully submit that the objections to the disclosure have been overcome, and should therefore be withdrawn.

V. OBJECTIONS TO THE DRAWINGS

The drawings have been objected to by the Draftsperson for the reasons noted in the form PTO 948 which accompanied the Office Action. In addition, the Examiner has objected

to Figures 35 and 36 due to the two occurrences of the number “300” contained therein.’ In response thereto, Applicants have submitted corrected Figures 35 and 36 which overcome the aforementioned objection.

VI. REJECTIONS UNDER 35 U.S.C. § 112

The Examiner has rejected claims 1, 2, 15-68, 98, 99, 107, 108, 120, 121, 129 and 130 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Claims 1, 2, 15-68, 99, 120, 121, 129 and 130 have been cancelled, without prejudice, by the current amendment. Thus, the rejection of these claims has been rendered moot and should therefore be withdrawn.

Claims 98 and 107 have been amended herein to include proper antecedent basis for “the cycle” as recited therein. Specifically, the claim limitation of “a cyclometallated compound having the cycle” has been replaced with “a cyclometallated compound including a cycle” to better clarify the scope of these claims. As claim 108 depends from claim 107, claim 108 includes this claim limitation as well. Thus, it is respectfully submitted that the rejection of claims 98, 107 and 108 under 35 U.S.C. § 112, second paragraph, has been overcome and should therefore be withdrawn.

VII. REJECTIONS UNDER 35 U.S.C. § 102

The Examiner has rejected claims 1, 2 and 15 under 35 U.S.C. § 102(b) as being anticipated by Maestri et al., “Photochemistry and Luminescence of Cyclometallated Complexes,” pp. 1-68 in *Advances in Photochemistry*, Volume 17 (1992) (“Maestri et al.”).

Claims 1, 2 and 15 have been cancelled, without prejudice, by the current amendment. Thus, the rejection of these claims has been rendered moot and should therefore be withdrawn.

The Examiner has also rejected claims 1, 28, 91 and 113 under 35 U.S.C. § 102(b) as being anticipated by Kunugi et al. in *J. Am. Chem. Soc.*, Vol. 120, pp. 589-590 (purportedly published on the internet on 1/7/98).

Claims 1, 28, 91 and 113 have been cancelled, without prejudice, by the current amendment. Thus, the rejection of these claims has been rendered moot and should therefore be withdrawn.

VIII. OBJECTIONS TO CLAIMS

The Examiner has objected to claims 92-94 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In the current amendment, Applicants have rewritten claim 92 in independent form, including all of the limitations of base claim 91. Dependent claims 93-94 depend from claim 92, and thus include these claim limitations as well. Thus, Applicants respectfully submit that the objection to claims 92-94 has been overcome and should therefore be withdrawn.

The Examiner has also objected to claims 114-116 and 122-134 under 37 C.F.R. § 1.75 as being a substantial duplicate of claims 92-94 and 100-112, respectively. Claims 114-116 and 122-134 have been cancelled, without prejudice, by the current amendment. Thus, the objection to these claims has been rendered moot and should therefore be withdrawn.

IX. NEW CLAIMS

New claims 135-141 have been added by the present amendment. Specifically, new independent claim 135 is directed to an organic light emitting device comprising an anode, a cathode and an emissive layer, wherein the emissive layer is located between the anode and the cathode and the emissive layer comprises a phosphorescent organometallic compound, wherein the phosphorescent organometallic compound is a cyclometallated compound including a carbon-metal bond. New claims 137 and 138 correspond to formerly generic claim 98 and former claim 99, respectively (both of which former claims were rejected only for indefiniteness under 35 U.S.C. § 112, and new claims 137 and 138 address such indefiniteness concerns). While new claim 135 is broader than former claims 98 and 99, it is believed that new claim 135 is allowable based on the reasoning applied to former claims 98 and 99. It is believed that no new matter has been added by any of the new claims.

X. MISCELLANEOUS

Grammatical issues have been identified regarding claims 35, 42 and 49. These claims have been cancelled without prejudice, rendering moot the grammatical issues.

To the extent that any new issue concerning patentability may be raised by the addition of joint inventor Peter Djurovich to U.S. Application Serial No. 09/311,126, filed May 13, 1999, based on his contribution to claims 92-94, 98 and 101-103, Applicants submit the references listed in the concurrently submitted IDS as discussed at the interview conducted on Monday, March 10, 2003. The Examiner's attention is drawn, respectfully, to Tang, page 3 (second paragraph -- note this reference does not have page numbers), Friend, page 125 (the paragraph spanning the two columns), and Schewe, last sentence.

The first sentence of the specification has been amended to delete a reference to Application No. 09/153,144, filed September 14, 1998, now U.S. Patent No. 6,097,147. The Applicants had previously claimed priority to this application, but are now withdrawing the priority claim. *See* MPEP § 707.05. It is believed that none of the present claims relied on the September 14, 1998 filing for support. The filing date of the earliest application presently relied upon for priority is now March 23, 1999 -- Application No. 09/274,609.

XI. CONCLUSION

Applicants respectfully submit that the present remarks and amendments place the application in condition for allowance, and such action is respectfully requested. If for any reason the Examiner believes that contact with Applicants' attorney would advance prosecution, the Examiner is invited to contact the undersigned at the telephone number given below.

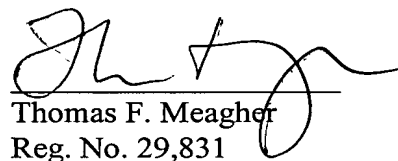
Respectfully submitted,

KENYON & KENYON

Dated:

4/15/03

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Specification:

The paragraph beginning on page 1, line 6, has been amended as follows:

This is a continuation-in-part of Application No. 09/274,609, filed March 23, 1999; Application No. 09/452,346, filed December 1, 1999; and Application No. 09/311,126, filed May 13, 1999, ~~which is a continuation-in-part of Application No. 09/153,144, filed September 14, 1998, now U.S. Patent No. 6,097,147.~~

The paragraph beginning on page 8, line 4, has been amended as follows:

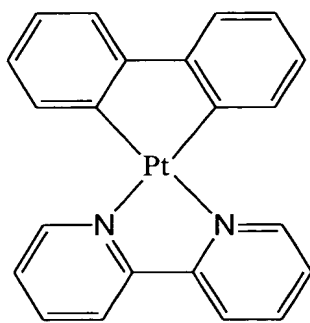
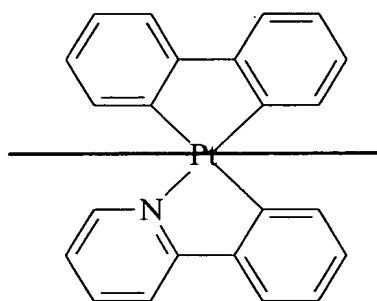
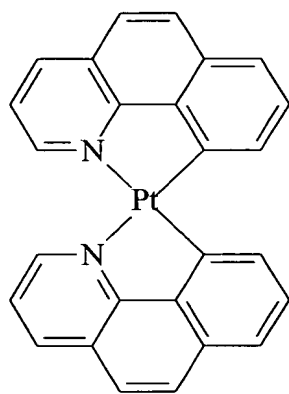
The exciton blocking layer used in the devices of the present invention (and previously disclosed in U.S. appl. ser. no. ~~09/154,044~~ 09/153,144) substantially blocks the diffusion of excitons, thus substantially keeping the excitons within the emission layer to enhance device efficiency. The material of blocking layer of the present invention is characterized by an energy difference ("band gap") between its lowest unoccupied molecular orbital (LUMO) and its highest occupied molecular orbital (HOMO). In accordance with the present invention, this band gap substantially prevents the diffusion of excitons through the blocking layer, yet has only a minimal effect on the turn-on voltage of a completed electroluminescent device. The band gap is thus preferably greater than the energy level of excitons produced in an emission layer, such that such excitons are not able to exist in the blocking layer. Specifically, the band gap of the blocking layer is at least as great as the difference in energy between the triplet state and the ground state of the host.

The paragraph beginning on page 16, line 34 has been amended as follows:

Figure 7. Proposed energy level structure of the electrophosphorescent device of Example 2.

The highest occupied molecular orbital (HOMO) energy and the lowest unoccupied molecular orbital (LUMO) energy are shown (*see* I.G. Hill and A. Kahn, J. Appl. Physics (1999)). Note that the HOMO and LUMO levels for Ir(ppy)₃ are not known. The inset bottom portion of Figure 7 shows structural chemical formulae for: (a) Ir(ppy)₃; (b) CBP; and (c) BCP.

The paragraph beginning on page 24, line 1 has been amended as follows:



cis-Bis[benzo(h)quinolino-N,C] Pt (II)
Pt(Bhq)₂(3)

(Biphenylinato-C,C)-(bipyridinato-N,N) Pt (II)
Pt(bph)(bpy)(4)

The paragraph beginning on page 30, line 12, has been amended as follows:

Optical properties of the Pt cyclometallated complexes : are shown above in Table 1.

The paragraph beginning on page 30, line 14, and ending on page 31, line 12, has been deleted.

In the Claims:

Claims 1-68, 91, 95-97, 99 and 113-134 have been cancelled, without prejudice.

Claims 92, 98 and 107 have been amended as follows:

92. (amended) An organic light emitting device comprising an anode, a cathode and an emissive layer, wherein the emissive layer is located between the anode and the cathode and the emissive layer comprises a phosphorescent organometallic compound. ~~The organic light emitting device of claim 91,~~ wherein the phosphorescent organometallic compound is an iridium compound including a carbon-metal bond.
98. (amended) The organic light emitting device of claim 92 ~~91~~, wherein the phosphorescent organometallic compound is a cyclometallated compound including a ~~having the~~ cycle closed with at least one metal-X bond, wherein X is selected from the group consisting of nitrogen, sulfur, phosphorous, arsenic and oxygen.
107. (amended) The organic light emitting device of claim 100, wherein the phosphorescent organometallic compound is a cyclometallated compound including a

having the cycle closed with at least one metal-X bond, wherein X is selected from the group consisting of nitrogen, sulfur, phosphorous, arsenic and oxygen.

New claims 135-141 have been added as follows.

135. (new) An organic light emitting device comprising an anode, a cathode and an emissive layer, wherein the emissive layer is located between the anode and the cathode and the emissive layer comprises a phosphorescent organometallic compound, wherein the phosphorescent organometallic compound is a cyclometallated compound including a carbon-metal bond.
136. (new) The organic light emitting device of claim 135, wherein the cyclometallated compound is a platinum compound.
137. (new) The organic light emitting device of claim 135, wherein the cyclometallated compound further includes a cycle closed with at least one metal-X bond, wherein X is selected from the group consisting of nitrogen, sulfur, phosphorous, arsenic and oxygen.
138. (New) The organic light emitting device of claim 137, wherein the cyclometallated compound is a platinum compound.
139. (new) The organic light emitting device of claim 137, wherein X is nitrogen.
140. (new) The organic light emitting device of claim 98, wherein X is nitrogen.

141. (new) The organic light emitting device of claim 107, wherein X is nitrogen.